Approach to data sources for ratings

Governance

BeZero

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Contents

Data sources used in BeZero Carbon Ratings

Dependable data forms the foundation of robust carbon ratings. BeZero Carbon's analytical teams utilise information provided by the registries and a growing list of more than 10,000 data sources for their analysis. These sources include:
- Peer-reviewed academic papers and journals
- Industry research reports
- Global, national and non-governmental public datasets
- Geospatial and Earth observation data

In addition to publicly available datasets and literature, BeZero's ratings are powered by data obtained from a unique assembly of academic and government partners and databases, including NASA, ESA, Planet, INPE, IPAM, UBC, ISRIC, etc.

Project-level data

BeZero extensively uses project-level information provided by registries, standards bodies, and project proponents. This includes ex ante documentation (e.g. project design documents, validation reports), ex post documentation (e.g. monitoring reports, verification reports), risk reports (e.g. non-permanence risk reports), credit issuances and retirements, buffer pool transactions, and geospatial boundary files. These data are collected and curated on an ongoing basis, ensuring that our ratings and analysis are supported by the most current information available.

A cornerstone of BeZero's analysis lies in the assumptions behind carbon credit issuance calculations. Reliable, transparent, and standardised data relating to a project's carbon accounting is essential to assess project claims and assign a rating. The four key components of issuance calculation comprise:

1. Baseline assumptions
2. Project net emissions
3. Leakage
4. Risk buffer allocation

BeZero Carbon has developed sector-specific carbon accounting templates to curate and standardise this information. When data is missing or unclear, BeZero's developer engagement team contacts the

project developers to fill in the gaps. We also provide the developers with detailed guidance on what information to share and how to share it ([guidelines on data disclosure](#)) to enable them to provide standardised, comparable data making it easy for the market participants to interrogate project claims.

Geospatial data

BeZero's geospatial analyses and models are supported by over 100 data sources, including space agencies, commercial satellite operators, government databases, academic research networks, crowd-sourced map data, and ecological field surveys. This work can be broadly summarised under the following five pillars:

1. **Project boundaries**. Obtained from the project developer or standards body where possible, or reconstructed from evidence embedded, or alluded to, in public documents, typically using a combination of proprietary image processing techniques, high-resolution satellite imagery, administrative borders, and AI-facilitated digitisation. These boundary data may change over time, for example where project instances are added to or removed from the carbon accounting area. We further digitise and curate the boundaries of all carbon projects in the landscapes around the project being rated, as well as any other protections, concessions, or easements that could inform our view of the project's carbon efficacy.

2. **Carbon stock density**. Estimation of project carbon relies on a combination of ground measurements, airborne surveys, and satellite observations. We combine publicly available, licensed, and research data across each of these sources, directly or via commercial or research partnerships. Examples include commercial partnerships with Planet Labs PLC and Kayrros, and research partnerships with Brazil's National Institute for Space Research (INPE), the Amazon Environmental Research Institute (IPAM), Uganda Wildlife Authority, and numerous others. The BeZero Carbon Plots Database harmonises discrete field inventory data from thousands of sites globally, while satellite-derived biomass estimates provide wall-to-wall, repeat observations across trillions of map pixels.

3. **Change detection.** We use a combination of freely-available, peer-reviewed change maps, such as those provided by the University of Maryland, NASA, ESA, and JAXA; monitoring products related to tree heights, canopy cover and biomass through our commercial partnerships, and proprietary in-house models derived using multispectral and LiDAR data from NASA, ESA, Planet and Maxar. These data are combined and applied according to the project's ecology, geography and activity type. For example, in forestry settings, detecting changes in tree height and cover is most important, whereas in the soil sectors, we construct models to detect changes in agricultural practices or rangeland management, while for landfill gas or well-plugging projects, we may monitor changes in flaring or methane emissions.

4. **Causal analysis.** We assess the extent to which carbon outcomes can be attributed to project activities, net of changes expected under business-as-usual. One line of evidence for attributing such causality is through the construction of independent statistical controls. Under this framework, we combine data from the other pillars with ancillary data on environmental and socioeconomic context, including climate and soil data, road and river networks, mill processing capacity, land ownership, indigenous areas and other protections, human population, mining or agricultural concessions, etc. Data are from satellite imagery

(NASA, ESA, Planet, Maxar), Open Street Map, various government and academic databases, Forisk, IBAT, and others relevant to the project context.

5. **Natural hazards.** In nature-based sectors, reversal risks can stem from natural events or anthropogenic activities, or some interaction between these factors. We assess risks from fire, drought, hurricanes, sea-level change, and pests and diseases, besides anthropogenic risks from land use, land tenure, community disengagement, and infrastructure development. To analyse natural hazards, we combine data from NASA, ESA, Planet, ECMWF, WMO, NOAA, IPCC, and ISRIC. Our research is supported by partnerships spanning space agencies (e.g. ESA), meteorological organisations (e.g. KNMI), government institutes and funding bodies (e.g. INPE, UKRI), non-profits (e.g. IPAM), and academic institutions (e.g. TU Dresden, UEA).

BeZero's approach to non-public information

BeZero Carbon strongly advocates for disclosure and transparency in the voluntary carbon market. Our eligibility criteria for a project to be rated acts as an important driver of transparency; if there is insufficient public information on a project's additionality test or third-party audits, BeZero Carbon will not rate the project.

In some instances, there are legitimate reasons for including private information where it improves the accuracy of the rating.

These types of information include:
- Non-public for legal, data protection, competitive, practical or other reasons
- Nature-Based Solutions (NBS) landowner boundaries
- Technical IP (including carbon models)
- Financial data and disclosures
- Early access to information due for publication

BeZero uses non-public information with the following principles in mind:
- Justify conclusions with analytical insights or analysis
- Do not disclose the specifics or details of the private information
- Use to mitigate uncertainty
- Seek to test, evidence, and corroborate independently
- Explain our opinion and conclusion at all times

This flexible approach allows for more accurate ratings. BeZero does not operate in a black box however; we continue to combine many data sources, and all opinions need to be evidenced and explained.

Updates and reviews

Version number	Date	Description
1.00	02/08/23	Initial release
1.01	23/02/24	Updated to reflect use of non-public information

Disclaimer

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